

Monsanto

FROM (NAME & LOCATION) **Paul B. Hodges - EISF General Offices**

file Asbestos Pollution

DATE **April 28, 1972**

CC

SUBJECT **PCB's - ALLOWABLE DISCHARGE
FROM PRODUCING/USING PLANTS**

REFERENCE

TO

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P. S. Park

K. W. Easley - Washington D.C.

G. L. Bratsch - WOK

A. E. Leisy/R. M. McCutchan

R. M. Blowers - WOK

P. E. Heisler/C. F. Buckley

D. A. Hippe - WOK

W. C. Engman/E. E. Stewart - WOK

CER 098502

IN 10 REV 11 69

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PCB's - ALLOWABLE DISCHARGE
FROM PRODUCING/USING PLANTS

MINUTES OF MEETING - 4/13/72 IN EPA OFFICES, WASHINGTON, D. C.

A. Present

For Monsanto

K. Warren Easley - Washington Office
W. B. Papageorge - G.O.
A. E. Leisy - WOK
R. M. Blowers - WOK
W. C. Engman - WOK
E. Scott Tucker - MIC - Research S. 2nd.
P. B. Hodges - G.O.

For EPA

John L. Buckley - Deputy Director - Ofc. of Research
Alphonse P. Forziati-Chief, Measurements & Instrumentation
Branch
Paul E. Des Rosiers-Staff Engineer, Industrial Pollution
Control
Elizabeth Anderson-Staff Chemist - Ofc. of Tech. Analysis
Gordon Everett - Director - Ofc. of Tech. Analysis
Marilee Miller - No title
Glenn Pratt - Chicago Region Enforcement
Kathleen Schirmer- Staff Ass't. (New Toxic Div. not established)

B. Background of Meeting

The Task Force for PCB's, with representatives from various Federal agencies including FDA, EPA, USDA and coordinated through the Office of Science and Technology, will soon release its voluminous report on the PCB's problem. Monsanto has cooperated with the involved agencies and had some insight into what would appear in the report. We agreed generally with nearly all of the report recommendations, but could not concur with two recommendations (as we understood them):

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- (1) Water quality standard for PCB's to be set at 0.01 ppb for rivers and lakes.
- (2) Zero detectable level in discharges from plants producing or using PCB's. An inconsistency existed in that we understood that the 0.01 ppb water quality standard was derived from a calculation involving 10-year low flows in the Mississippi River and a 3 lbs/day discharge from our WCK Plant (their understanding of what we were discharging to the river - the 3 lbs/day is equivalent to about 0.01 ppb in the river with no allowance for background).

A meeting was requested to discuss these recommendations with Dr. Buckley, with intent to prepare a formal presentation for them. However, due to time pressures in EPA, the meeting was set up on 1 day's notice. Our information and comments had, therefore, to be presented informally, with little time for preparation. The Monsanto group met to plan for the meeting on Wednesday afternoon, the various assignments/presentations were prepared that night and were reviewed on the plane to Washington, followed by another quick review in Warren Easley's office.

Our objectives for the meeting were:

- (1) To induce EPA to recommend a more realistic water quality standard than the 0.01 ppb - say, 0.1 ppb. The higher level would be more in the range of reasonable precision by the average laboratory and would recognize a small PCB background.

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- (2) To induce EPA to drop the "zero discharge" concept and to allow a reasonable discharge (5 lbs/day) in terms of lbs per day - not concentration. 5 lbs/day is consistent with requests of the electrical industry using PCB's.
- (3) To induce EPA to allow a reasonable time to attain the discharge limit.

C. Minutes of Meeting

- (1) Following "round-robin" introductions, W. Papageorge stated our appreciation of this first opportunity to discuss with them the problems involved with plant discharges. He stated our desired format, which was to have various plant people discuss what we had done and were doing to control PCB discharges and to explain the problems involved. Buckley concurred.
- (2) Art Laisy spoke briefly of the complex nature of the WCK Plant, the relationship to Sauget Village and the concern within manufacturing of the environmental impact of wastes from the manufacturing processes.
- (3) Dick Blowers discussed physical growth of the plant, complexity of the sewer system, size and extent of our current program for in-plant waste reduction and control. He pointed out that PCB's were a major one of numerous concerns where we were actively planning recycling or otherwise reducing wastes. He did not discuss the type of waste treatment Sauget Village is contemplating. Some remarks from Glenn Pratt and others about secondary biological treatment were ignored.

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(4) Bill Engman described the PCB containment and in-plant reduction program (full text is attached). At the close of his talk, he stated the present level of discharge as follows:

(a) From PCB manufacturing facilities - 2 to 4 lbs/day.

(b) From the Village waste treatment plant, 5-10 lbs/day.

(5) Dr. Buckley went through his rationale for the proposed limits:

(a) PCB in water is toxic to fish at very low levels - under 1 ppb for some species.

(b) They know from experience that PCB levels magnify greatly from water to fish - he said 75000X. With that factor and a FDA allowable limit of 5 ppm, allowable PCB concentration in water would be:

$$\frac{5 \text{ ppm}}{75000} = 0.07 \text{ ppb (approx.)}$$

With using a safety factor (7), this brought the allowable water level to 0.01 ppb. Buckley stated his intent that the 0.01 ppb level not be imposed as a legal standard but be used as a working limit.

(c) As a check on the reasonableness of that level, he had calculated the effects of our discharge of 3#/day (their figure) on the Mississippi River at 10 year low flow of 50,000 cu ft/sec.

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That also equals 0.01 ppb at the low flow (or about 1/3 of that at average flow of 175,000 cu ft/sec which would allow an additional safety factor).

- (d) They (EPA) have no actual measurements of PCB levels in the Mississippi south of LaCrosse, Wis. and don't plan to do any water measurement work. Buckley appeared disappointed that we have no actual background level measurements in the Mississippi River. They will plan to do monitoring by fish concentration studies - if fish PCB concentrations are under 0.75 ppm, the ambient water is likely to be under 0.01 ppb.
- (6) As to allowable discharge, Buckley said they were considering a policy of zero "knowing discharge" (a term new to us and meaning any discharge above the absolute background level). This would appear to allow continuation of our background discharge plus a minimum amount from production facilities. He said that, where we were presently down to 2-4 lbs/day from our production unit, we could probably do more work and get to 1-2 lbs/day and that (plus our background) would be our "zero knowing discharge". (Note, in a later telephone conversation with Bill Papageorge, Buckley confirmed the above and said he planned to circulate a private memo within EPA explaining what "knowing" and "non-knowing" discharges meant and that our present discharge from production facilities of 2-4 lbs/day appeared reasonable).

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- (7) Scott Tucker questioned ability to measure at the 0.01 ppb level. Dr. Forziati stated that their Athens, Ga. and Cincinnati, Ohio Analytical Labs are capable of easily detecting 0.01 ppb of PCB's in environmental samples, but they would not feel confident enough in their numbers to attempt enforcement at this low of a level. He went on to state that, "they would be confident enough at the 0.1 ppb level to go to court." When presented with the results of our internal round robin study (PCB method accuracy and precision) at a level approximately 50 thousand times higher than the proposed 0.01 ppb number, he again stated their labs were achieving better results. He also indicated that they were making quantitative PCB measurements via mass spectography at the nanogram level.

(Notes from Scott Tucker - "Based upon our lab experience, I would say that Dr. Forziati is a little overly optimistic with regard to the accuracy and precision of current PCB methodology. Dr. Forziati extended an invitation to Monsanto to visit their facilities and it is currently planned to contact him and arrange a visit. The objective of the visit will be to get a better feeling for their PCB analytical capabilities and to establish direct contacts with their analytical people").

- (8) Paul Hodges raised the question of mixing zones. Dr. Buckley had stated that full flow in the river was used in calculating dilutions in the river because there was no acute toxicity problem with fish around the outfall.

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Hodges pointed out that, when the Federal report is released, the states will move to enact PCB water quality standards and discharge regulations. Some of them, specifically Illinois, use limited mixing zones to determine compliance with water quality standards (in Illinois the sample is taken 600 feet downstream from the outfall). Hodges requested that the Federal report spell out the principle of using full dilution in the river. Buckley agreed.

- (9) As an aside after the meeting, Glenn Pratt (Surveillance, Chicago Regional EPA office) said that they were concerned about the levels of mercury being reported to Illinois since they were over 0.25#/day. He said he had written a letter saying they wanted to come to see us about mercury and about PCB's but had not sent the letter when the subject meeting was arranged. He would be contacting us in 2-3 weeks. Art Leisy had, earlier in the meeting, invited Pratt to inspect our PCB production unit and control facilities.

D. Summary and Conclusions

- (1) We feel that Dr. Buckley is taking a reasonably realistic approach to control with his "knowing" and "non-knowing" discharge concept. However, we are dubious that:
- (a) It will hold up as the document is reviewed within higher levels and other branches of EPA.
 - (b) The Illinois Pollution Control Board will be as understanding as is Buckley when they move to formulate water quality standards and discharge

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regulations for PCB's. We would expect the Board to move shortly after publication of the Federal Task Force document and announcement of standards and regulations by the Federal EPA.

- (2) The 0.01 ppb water quality limitation is likely to hold up even though measurements at this level are not accurate and the Federal people have very limited data on PCB concentrations in rivers and lakes. It is also likely to become or to be used as a legal standard.
- (3) Apparently, Buckley moved quickly in his calculations establishing the 0.01 ppb limitation from the FDA level of 5 ppm in edible portions of fish to magnification of 75000X from water to lipid portions of fish (see C-5 above). This provides an additional safety factor to the 7X in his calculations. This was not really challenged at the meeting.
- (4) We don't know whether or not 0.01 ppb is exceeded either above or below our outfall in the Mississippi River. We have analyzed two large adult Mississippi River carp for PCB's. They contained apparent PCB concentrations of 1.4 ppm and 5.1 calculated on the whole fish basis. Using Dr. Buckley's concentration factor of 75,000 indicates that the river could contain 0.02 - 0.07 ppb at the point where these fish were collected (this assumes that the 75,000 factor could apply to whole fish - we are uncertain about this). Further fish/water monitoring is needed.


Paul B. Hodges

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TALK GIVEN TO FEDERAL EPA 4/13/72

As Plant Technical Services Superintendent, I have been associated with the in-plant PCB reduction program for the past two years. During this period we have had 1-2 full time chemical engineers working on the reduction program. They have been assisted by E & I and mechanical engineers from TSD. Our plant environment control group consisting of five full time persons have also contributed a large portion of their time to this effort. With the support of Monsanto's top management, the Krummrich Plant has assigned top priority to this reduction program. Let me assure you that activity and concerned effort has been high.

Our initial technical work was in two areas. First, sources of actual and potential PCB losses were identified and appropriate projects were undertaken. These projects had the objective of elimination or containment of the loss.

1. Catch basins were installed in the producing department to contain accidental spills and department clean-up.
2. Paving and curbing was installed around PCB storage and loading areas again to prevent accidental loss.
3. Five separate projects were completed to the manufacturing equipment and facilities themselves to bring all known points of loss under tight control and to reduce these losses to their absolute practical minimum.
4. All heat transfer units in the plant (15 in total) were modified and changed to substitute non-PCB heat transfer fluids.

Our second area of technical effort has been in establishing a monitoring program. Here we have met with considerably less success. Let me illustrate.

1. First we tried to balance our plant PCB losses with PCB levels entering the Sauget Village Municipal treatment facilities. We used our elaborate sampling systems which have been highly successful and other plant pollution applications. Our objectives were to use our main plant sewer outflows as a base to back-track through our plant sewers to points of origin of loss. In no way could we obtain a balance. PCB levels were different by factors of 1.5 to 3.

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2. We then did some experimentation.

- a. We first ran profiles down each of the two main sewers leaving the plant. By this I mean we sampled four adjacent sewer boxes along each sewer line in a short space of time. Results went something like this: in one sewer, the third sample point down the line had 20 times less PCB than the other three points. On the other sewer line, the 4th sample point down the line had a 5-1/2 times higher PCB level than the first three sample points.
- b. We tried a second experiment. At one sewer box we sampled the sewer line at the top, bottom, sides and middle. We did this for both the sewer line entering and leaving the box. On the exit flow, we found the highest level in the center flow about 1-1/2 to 2 times higher than the other points. In the entering flow, the sample taken at the bottom of the pipe had a level 200 to 400 times higher than the other points.
- c. We next took a number of samples both in-plant and in the exit stream to the Mississippi River and filtered a portion of the sample in the laboratory. In all cases the filtered samples showed a 70 to 90% reduction in PCB level when compared to the corresponding unfiltered sample.

3. The problem at this point became obvious. We were attempting to obtain representative samples where solids concentration was the most important variable in the sample. This problem was and is compounded by solids stratification in the sewer lines themselves.
4. From this point we have gone through an evolution of sampling devices with the objective of obtaining what we feel is a truly representative sample from our sewers. At this time, this objective has not been fulfilled. A number of factors are involved.
 - a. Do you point the sampler upstream or downstream?
 - b. Do you pump the sample fast or slow?
 - c. Where do you place the sampler in the sewer line? Middle? What is the sensitivity of moving slightly left or right or up or down?
 - d. and so forth.

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Not all of these questions have been answered as yet but we are continuing our efforts to resolve them. I think it goes without saying that, as we reach very low discharge levels, we are keenly aware of the need to obtain true representative samples and accurate results in order to continue carrying out an effective further reduction program.

This brings us to where we are today.

1. Although all our in-plant sources of loss are essentially eliminated or contained through projects that have been completed, we are continuing to change and modify our operation to further minimize potential losses.
2. Our on-going sampling control program is confined to the in-flow and out-flow from the Sauget Village Municipal treatment facilities as we feel this gives us the most accurate data.
3. We are continuing to improve and upgrade our techniques of sampling.
4. In the producing department we are installing a Parshall flume which is a device to measure sewer flow. This will improve our ability to monitor and control at this point.

What are present level of losses?

1. From our PCB manufacturing facilities they range from 2 to 4 #/day at our current production rate of 3 to 3-1/2 million #/month.
2. From the Municipal treatment facilities to the Mississippi River, losses are 5 to 10 #/day average depending on the type of sampler used.

Why the difference? The problem is age. We have been producing and using PCB's at the Krummrich Plant for over 30 years. We have a complicated old sewer system inside the plant. Although we have a continuing plant program to repair and upgrade plant sewers, at no time do we expect that the sewers are leak free. In fact, it would be nearly impossible to tell. We are confident that this situation contributes significantly to the losses we see in the out-flow to the river. This source of loss will decline with time.

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In summary, let me say activity has, is, and will remain high in carrying out our PCB reduction program. It is my understanding that the proposed standard is detectable loss to the river. Based on our experience, we feel that this is both unrealistic and unachievable.

As a result of our efforts, we have reduced our losses, as mentioned before, to the 5 to 10 #/day range. We feel this is a realistic range at this time considering the problems we face.

W. C. Engman

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